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properly dried and prepared, it is aromatic and not unpleasant, . . . certainly a good substitute for indifferent black tea." A very fragrant drink was also prepared from the Spice-Bush (*Lindera Benzoin* Blume), as well as from Wintergreen (*Gaultheria procumbens*) and Sweet Fern (*Myrica asplenifolia*). Much less acceptable must have been the infusion from Marsh Tea (*Ledum palustre* L.) and Labrador Tea (*L. Groenlandicum* Oeder) which, but specially the first, contain an acrid aromatic oil. According to Pursh and more recent observers, the dried leaves and flowers of the Sweet Goldenrod (*Solidago odora* Ait.) are a pleasant and wholesome substitute for tea.

While in western Texas, I became familiar with the Encenilla or Chaparral Tea (*Croton corymbulosus* Engelm.) quite abundant in that region. An infusion of the flowering tops makes a very palatable drink much used by Mexicans and Indians, as well as by our colored U. S. soldiers who prefer it to coffee. It appears to be entirely devoid of theine or any other stimulating principle except volatile oils. Other plants similarly used and valued in the same country and northern Mexico are *Bidens Bigelovii* Gray, *Salvia ballotaeflora* Benth., *Hedeoma Drummundii* Benth. and *Actinella odorata* Gray.

New Species of Leguminous Pods from the Yellow Gravel at Bridgeton, N. J.

By Arthur Hollick.

(Plates 258, 259.)

In a paper read before the Club some years since, and subsequently published in the Bulletin,* I mentioned the occurrence, in great abundance, of leguminous pods, in the Yellow Gravel sandstone at Bridgeton, N. J., with which were associated leaves of common eastern North American trees and shrubs, such as *Magnolia acuminata* L., *Asimina triloba* (L.) Don., *Persea Borbonia* (L.) Spreng. etc. In the final identification of the material these pods remained as incongruous elements, apparently representing

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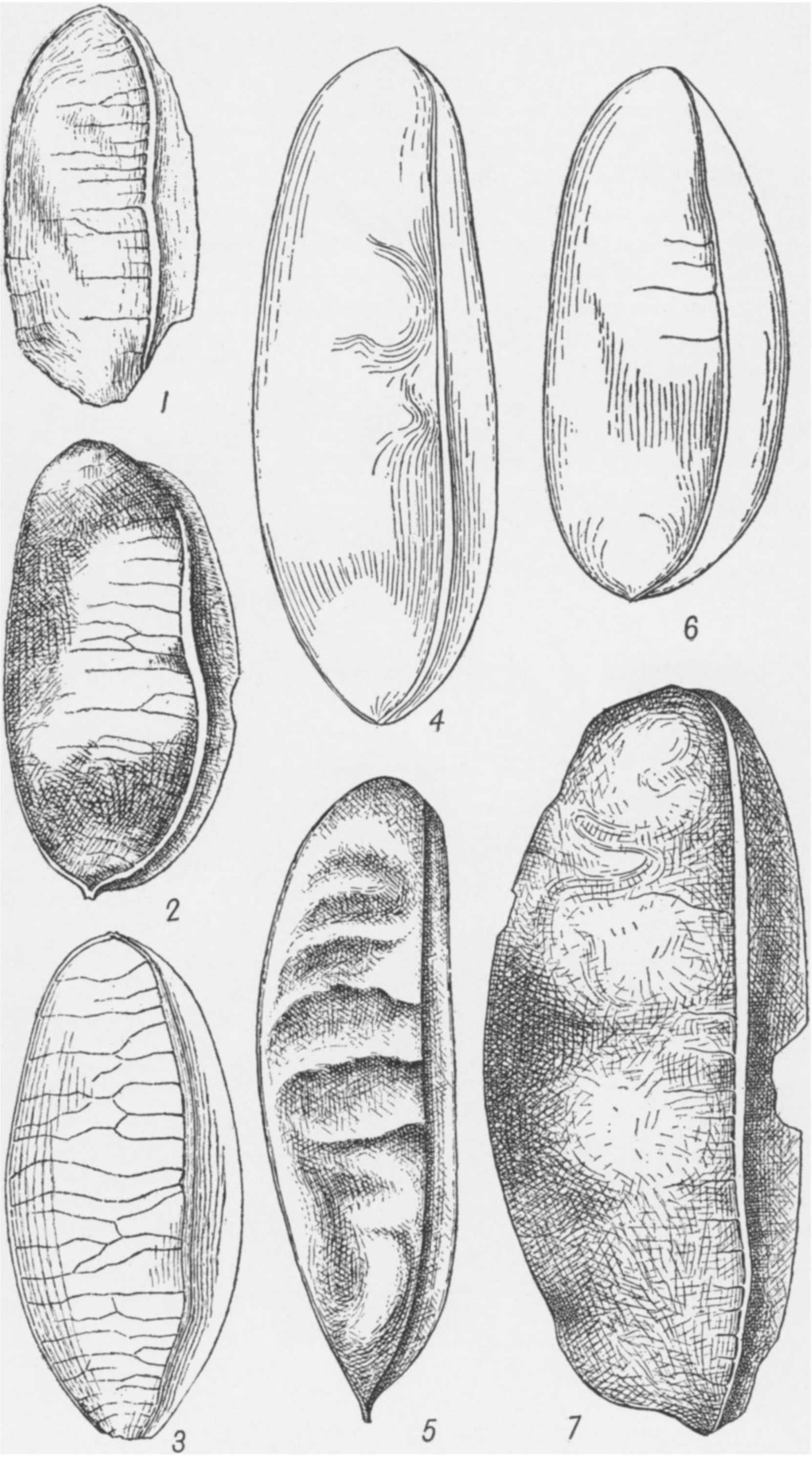
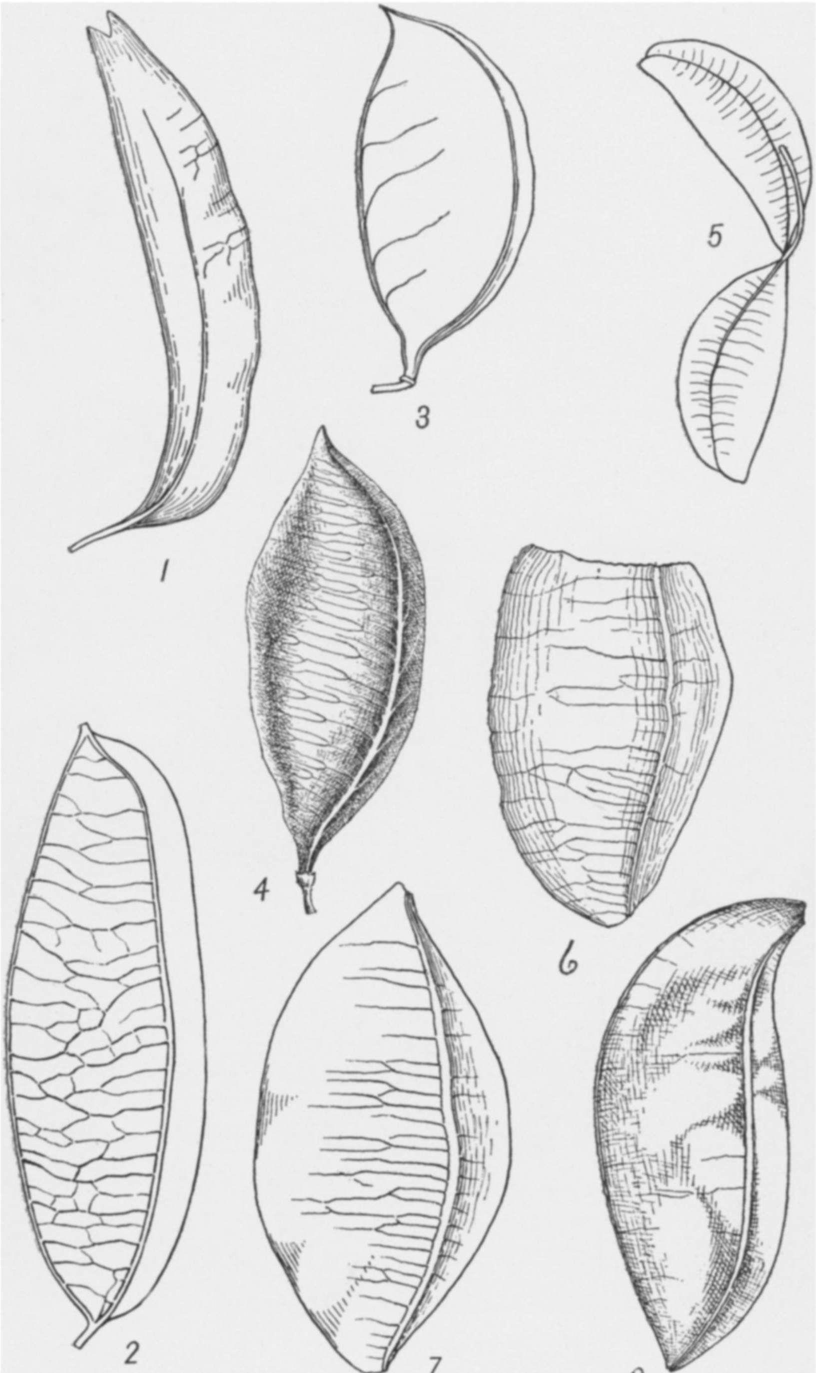
* Palaeobotany of the Yellow Gravel at Bridgeton, N. J., Bull. Torr. Bot. Club, 19: 330–333.

BULLETIN OF THE TORREY BOTANICAL CLUB.—PLATE 258.



MEZONEURUM BRIDGETONENSE HOLLICK.



RECENT AND FOSSIL LEGUMINOUS PODS.

the genera *Mezoneurum* and *Lonchocarpus* (including *Derris* and *Pongamia*), which are of tropical or southern distribution and are not now known north of Mexico. The first named genus is not even reported from any part of the American continent, but is confined to tropical Asia and Africa, with a single species (*M. brachycarpum* Benth.) in Australia. The genus *Lonchocarpus* occurs in South America, Africa, Asia and Australia. The subgenus *Pongamia* is confined to Asia and Australia.

In the fossil state the species thus far described and figured in these genera are few and more or less unsatisfactory.

In *Mezoneurum* four have been recognized, viz.:

1. *Mezoneurum Radobojanum* Ung. Syll. Plant. Foss. Part 2, 28. *pl. 11. fig 1.*

2. *M. lygodioides* Ung. Denksch. Wien Akad. 11: 172. *pl. 8. fig. 18.* 1856.

3. *M. tripos* Ung. l. c. 173. *pl. 8. fig. 19.*

4. *M. dimidiatum* Wat. Plant. Foss. Bass. Paris, 244. *pl. 60. fig. 10.*

Of these the first and last mentioned are pods. The others are mere problematic organisms of but little value in this connection. All are from Tertiary strata in Europe.

In the genus *Lonchocarpus* two fossil forms have been recognized, viz:

1. *Lonchocarpus latifolius* Kth., a living species, reported from the Pleistocene (?) strata of Chorillo, Cuba, by P. P. Galtés, in a work entitled, "Memoria sobre unos fossiles vegetales encontrados en el Chorillo." [*]

2. *L. obtusifolius* Engelh. Abh. Isis, 1894. 7. *pl. 1. fig. 22;* Abh. Senckb. Naturforsch. Gesellsch. 19: 17. *pl. 3. fig. 1.* 1895; leaves from Tertiary strata in South America.

The only fossil representative of the subgenus *Pongamia* to which I have been able to obtain any reference is *P.*[†] *protogaea* Massalongo, Neu. Jahrb. Min. 1857, 778, where it is mentioned in a list of plants from the Tertiary strata of Monte Bolca, Italy. It was subsequently described in Atti Reale Inst. Veneto di Sci.

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[*] This reference was given me by Professor Lester F. Ward, of the United States Geological Survey, but neither of us has had access to the work, and we do not know whether the fossil was a pod or a leaf.

[†] Spelled *Pungamia.*

Lett. ed. Art. (III.) 3: 769, 1858, and later both leaves and fruit were figured in "Specimen Photographicum," 97. *pl. 40. figs. 2, 3*, 1859, but I have unfortunately not had access to these works.

The exact geologic age of the Bridgeton sandstone has not been definitely settled, but it evidently represents late Tertiary or Pleistocene, containing a flora which is almost identical, in both species and genera, with that of the latitude of Virginia at the present time.

The main point of interest in connection with these pods is that whereas their former companions are yet represented, both in genera and species, in the living vegetation of the region, the genera to which they are referred are no longer to be found there, but are elements in a more tropical flora. The fact that I have been unable to compare them satisfactorily with living species would indicate, taken in connection with the other circumstances of their occurrence, that they represent the last struggle for life of these genera in this latitude, due to the changing climatic conditions which preceded the advent of the Ice Age. Previous to that time they were widely distributed throughout both continents. The north temperate species were obliterated, and only those which existed further south were able to continue their existence. This supposition is also strengthened by the reference of the fossil species found further south to the living *Lonchocarpus latifolius*.

The facts in regard to the past history and distribution of these genera are of the utmost significance when taken in connection with their present distribution. Several of the problems of their present distribution would be exceedingly difficult of explanation if we did not have these facts to guide us. The improbable theory of migration in recent times is no longer a necessary one, and we are led to the rational conclusion that genera, the species of which are now widely separated in different portions of the earth, were formerly of universal distribution but have become extinct over many wide areas where they formerly existed, due to changes in environment.*

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* In this connection see "Zur Theorie der Entwickelung der jetzigen Floren der Erde aus der Tertiarflora." C. F. von Ettingshausen. Sitzb. Wien Akad. Wiss. Math. Naturwiss. Classe, 103: 369. 1894.

For purposes of comparison I have introduced figures of pods representing living three species, viz: *Mezoneurum cucullatum* L., *Pongamia glabra* Vent. and *Lonchocarpus neuroscapha* Benth. and copies of two figures representing fossils which have been referred to the first of these genera, viz: *Mezoneurum dimidiatum* Wat. and *M. Radobojanum* Ung.

The new species are:

MEZONEURUM BRIDGETONENSE n. sp.

(Plate 258, Figs. 1–7.)

Pods 2¼ in. to 4 in. long by 1 in. to 1¾ in. wide in middle, obtuse and slightly recurved at end, abruptly rounded or attenuated at base; suture prominent, distant about ¼ in. from middle of nearest margin; reticulations more or less prominent laterally, extending from suture to farthest margin, with occasional cross connections, few or none between suture and nearest margin.

LONCHOCARPUS NOVAE-CAESAREAE n. sp.

(Plate 259, figs. 6–8.)

Pods about 2¾ in. long by 1 in. to 1¼ in. wide in middle, tapering to end and base, recurved at end, curved or recurved at base; suture prominent, distant about ¼ in. from middle of nearest margin; reticulations more or less prominent laterally, between suture and farthest margin, with cross connections which give an appearance of forking, a few more or less obscure and simple nerves between suture and nearest margin.

Explanation of Plates.

PLATE 258.

Figs. 1–7. *Mezoneurum Bridgetonense* Hollick.

PLATE 259.

Fig. 1. *Mezoneurum dimiaiatum* Wat. Plant. Foss. Bass. Paris, 244. *pl. 60. fig. 10.*

Fig. 2. *Mezoneurum cucullatum* L. Cult. in Kew gardens. Specimen in Herb. Columbia College.

Fig. 3. *Pongamia glabra* Vent. Hong Kong. Specimen in Herb. Columbia College.

Fig. 4. *Lonchocarpus neuroscapha* Benth. From Mart. Fl. Brasil. **15**: part 1 *pl. 99.*

Fig. 5. *Mezoneurum Radobojanum* Ung. Syll. Plant. Foss. part 2, 28. *pl. 11. fig 1.*

Figs. 6–8. *Lonchocarpus Novae-Caesareae* Hollick.